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IN THE CLAIMS

Please amend the claims as follows:

1. (Previously Presented) A catalytic combustor comprising:

a first catalytic stage comprising a metallic catalyst support and receiving an oxidizer and a fuel and discharging a partially oxidized fuel/oxidizer mixture;

a second catalytic stage comprising a ceramic reticulated foam catalyst support disposed within a pressure boundary defining a pressure boundary cross-sectional flow area, the foam catalyst support receiving a first portion of the mixture and presenting a support cross-sectional flow area less than the pressure boundary cross-sectional flow area to define a bypass passageway for allowing a second portion of the mixture to bypass the foam catalytic support, the second catalytic stage having an outlet temperature elevated sufficiently to completely oxidize the mixture without using a separate ignition source;

an oxidation completion stage disposed downstream of the second catalytic stage for recombining the first and second portions of the mixture and completing oxidation of the mixture, and

a transition stage disposed between the first catalytic stage and the second catalytic stage, the transition stage comprising a narrowed flow area region disposed between an inlet end receiving the partially oxidized fuel/oxidizer mixture from the first catalytic stage and an outlet end discharging the partially oxidized fuel/oxidizer mixture into the second catalytic stage, wherein the narrowed flow area region of the transition stage has a narrower flow area than each of the first catalytic stage and the second catalytic stage.

2. (Original) The catalytic combustor of claim 1, wherein the second catalytic stage further comprises a catalytic material selected from the group consisting of perovskite, zeolite, and hexaaluminate.

3. (Original) The catalytic combustor of claim 1, wherein the bypass passageway is disposed around a portion of a perimeter of the ceramic reticulated foam catalytic support.

4. (Original) The catalytic combustor of claim 1, wherein the ceramic reticulated foam catalytic support comprises a cruciform cross-section.

5. (Original) The catalytic combustor of claim 1, wherein the ceramic reticulated foam support comprises a donut-shaped cross-section.

6. (Currently Amended) A catalytic combustor comprising:

a first catalytic stage receiving an oxidizer and a fuel and discharging a partially oxidized fuel/oxidizer mixture; and

a second catalytic stage receiving the partially oxidized fuel/oxidizer mixture and further oxidizing the partially oxidized fuel/oxidizer mixture, the second catalytic stage comprising a passageway for conducting a bypass portion of the partially oxidized fuel/oxidizer mixture past a catalyst disposed therein and having an outlet temperature elevated sufficiently to complete oxidation of the partially oxidized fuel/oxidizer mixture without using a separate ignition source; wherein the second catalytic stage further comprises a plurality of separate catalytic elements disposed along a flow axis of the combustor, each of the plurality of separate catalytic elements comprising an identical cross-section and being misaligned and axially rotated about the flow axis with respect to an adjacent catalytic element effective to cause mixing of a flow about the flow axis;

an oxidation completion stage disposed downstream of the second catalytic stage recombining the bypass portion with a catalyst exposed portion of the partially oxidized fuel/oxidizer mixture and completing oxidation of the partially oxidized fuel/oxidizer mixture.

7. Cancelled)

8. (Original) The combustor of claim 6, wherein the second catalytic stage further comprises a catalytic material selected from the group consisting of perovskite, zeolite, and hexaaluminate.

9. (Original) The combustor of claim 6, wherein the second catalytic stage further comprises a first region comprising a first catalytic material, and a second region disposed downstream of the first region and comprising a second catalytic material different from the first catalytic material.

10. (Original) The combustor of claim 6, further comprising:

a first catalytic material disposed on a metallic support in the first catalytic stage; and

a second catalytic material, different from the first catalytic material, disposed on a ceramic support in the second catalytic stage.

11. (Original) The combustor of claim 6, wherein the second catalytic stage further comprises a metallic support comprising a metal alloy selected from the group consisting of molybdenum disilicide, iron-chromium-aluminum, and iron aluminide.

12. (Original) The combustor of claim 6, wherein the second catalytic stage further comprises a catalytic material disposed on a ceramic reticulated foam catalyst support.

13. (Cancelled)

14. (Previously Presented) The combustor of claim 6, wherein the separate catalytic elements comprise ceramic reticulated foam catalyst supports comprising different pore size grades.

15. (Cancelled)

16. (Previously Presented) The combustor of claim 6, wherein the separate catalytic elements comprise different catalytic materials.

17. (Cancelled)

18. (Previously Presented) The combustor of claim 6, wherein each catalytic element is spaced apart from an adjacent catalytic element along the flow axis.

19. (Original) The combustor of claim 6, wherein the second catalytic stage further comprises a tubular catalyst support coated with a catalytic material on an outside surface and an inside surface.

20. (Original) The combustor of claim 6, wherein the second catalytic stage further comprises a plurality of catalytic material coated plates defining longitudinal passageways.

21. (Original) The combustor of claim 6, wherein the second catalytic stage further comprises a catalyst support selected from the group consisting of a honeycomb structure, a tower packing structure, and a packed particle structure.

22. (Original) The combustor of claim 6, wherein the first catalytic stage comprises a rich catalytic stage.

23. (Cancelled)

24. (Currently Amended) A catalytic combustor comprising:

an upstream pressure boundary comprising a catalytic surface disposed thereinfor receiving a fuel/oxidizer mixture and discharging a partially oxidized fuel/oxidizer mixture;

a downstream pressure boundary defining a pressure boundary cross-sectional flow area for receiving the partially oxidized fuel/oxidizer mixture; and

a catalyst-coated reticulated foam support disposed within the ~~second~~ downstream pressure boundary for receiving a first portion of the mixture and presenting a support cross-sectional flow area less than the ~~second~~ downstream pressure boundary cross-sectional flow area to define a bypass passageway for allowing a second portion of the fuel/oxidizer mixture to bypass the foam support; ~~and~~

wherein the bypass passageway is disposed around a portion of an outer perimeter of the reticulated foam support

~~a transition pressure boundary disposed between the upstream pressure boundary and the downstream pressure boundary, the transition pressure boundary comprising a narrowed flow area region effective to generate a venturi effect disposed between an inlet end receiving the oxidized fuel/oxidizer mixture from the upstream pressure boundary and an outlet end discharging the partially oxidized fuel/oxidizer mixture into the downstream pressure boundary, wherein the transition pressure boundary is configured to substantially limit combustion of the partially oxidized fuel/oxidizer mixture from the upstream pressure boundary~~.

25. (Original) The catalytic combustor of claim 24, wherein the reticulated foam support comprises a cross-section sized to bypass from 25% to 80% of the mixture past the foam support element.

26. (Original) The catalytic combustor of claim 24, wherein the reticulated foam support defines a plurality of separate passageways within the pressure boundary.

27. (Canceled)

28. (Original) The catalytic combustor of claim 24 wherein the reticulated foam support comprises a cruciform cross-section.

29. (Original) The catalytic combustor of claim 24 wherein the reticulated foam support comprises a donut-shaped cross-section.

30. (Currently Amended) The catalytic combustor of claim 24 wherein the reticulated foam support comprises a cross-section perimeter smaller than an internal perimeter of the pressure boundary, the foam support supported against the internal perimeter by spaced apart standoffs comprising the reticulated foam support.

31. (Original) The catalytic combustor of claim 24 wherein the reticulated foam support comprises a ceramic material.

32. (Previously Presented) The catalytic combustor of claim 1, wherein the narrowed flow region is configured for generating a venturi effective to protect the first catalytic stage from heat generated in the second catalytic stage.

33. (Previously Presented) The catalytic combustor of claim 6, wherein the narrowed flow region is configured for generating a venturi effective to limit flashback into the first catalytic stage.

34. (Previously Presented) The catalytic combustor of claim 1, wherein the transition stage is configured to substantially limit combustion of the partially oxidized fuel/oxidizer mixture from the first catalytic stage.

35. (Previously Presented) The catalytic combustor of claim 6, wherein the transition stage is configured to substantially limit combustion of the partially oxidized fuel/oxidizer mixture from the first catalytic stage.

36. (New) The catalytic combustor of claim 24, further comprising a transition pressure boundary disposed between the upstream pressure boundary and the downstream pressure boundary, the transition pressure boundary comprising a narrowed flow area region effective to generate a venturi effect disposed between an inlet end receiving the oxidized fuel/oxidizer mixture from the upstream pressure boundary and an outlet end discharging the partially oxidized fuel/oxidizer mixture into the downstream pressure boundary, wherein the transition pressure boundary is configured to substantially limit combustion of the partially oxidized fuel/oxidizer mixture from the upstream pressure boundary.